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ABSTRACT

The Individualized Classroom Environment Questionnaire (ICEQ) is designed to measure student or teacher perceptions of actual and preferred classroom learning environment along dimensions which differentiate individualized classrooms from conventional ones. These dimensions are Personalization, Participation, Independence, Investigation, and Differentiation. This paper reports data analyses which provide information about: (1) the validity of the ICEQ: (2) differences between scores on different forms of the ICEQ: (3) relationships between student learning outcomes and perceptions of classroom individualization: and (4) relationships between student learning outcomes and actual/preferred congruence. A copy of the ICEQ is appended. (Author/BW)

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VALIDITY AND USE OF

INDIVIDUALIZED CLASSROOM ENVIRONMENT QUESTIONNAIRE

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Introduction

The Individualized Classroom Environment Questionnaire (ICEQ) is a new instrument measuring student or teacher perceptions of actual and preferred classroom learning environment along dimensions which differentiate individualized classrooms from conventional ones. This paper reports data analyses which provide information about:

a) the validity of the ICEQ;
b) differences between scores on different forms of the ICEQ;
c) relationships between student learning outcomes and perceptions of classroom individualization;
d) relationships between student learning outcomes and actual-preferred congruence (i.e., person-environment fit).

Background

Over the previous ten to fifteen years, considerable interest has been shown internationally in the conceptualization, measurement, and investigation of perceptions of psychosocial characteristics of classroom learning environment. The field of classroom environment is now firmly established through recent key publications including two books (Moos, 1979; Walberg, 1979), a monograph (Fraser, 1981a), a meta-analysis (Haertel, Walberg, and Haertel, 1979) several reviews (Walberg, 1976; Walberg and Haertel, 1980; Fraser and Walberg, 1981), and a special guest-edited issue of the journal Studies in Educational Evaluation (Fraser, 1980a).

The two perceptual instruments used most extensively in prior research are the Learning Environment Inventory (Anderson and Walberg, 1974, 1976) and the Classroom Environment Scale (Trickett and Moss, 1973; Moos and Trickett, 1974). These instruments include scales such as Competition, Formality, Difficulty, and Rule Clarity, but neglect dimensions especially salient in open or individualized classrooms. Consequently, the ICEQ was developed to assess five dimensions (namely, Personalization, Participation, Independence, Investigation, and Differentiation) which differentiate individualized and conventional classrooms.

Another feature which distinguishes the ICEQ from most other classroom environment instruments is that it has four distinct forms which measure:

a) student perceptions of actual classroom environment (Student Actual form);
b) student perceptions of preferred classroom environment (Student Preferred form);
c) teacher perceptions of actual classroom environment (Teacher Actual form);
d) teacher perceptions of preferred classroom environment (Teacher Preferred form).

The preferred forms are concerned with goals and value orientations and measure perceptions of the classroom environment ideally liked or preferred. Having these four different forms has enabled the ICEQ to be used in investigating differences between teachers and students in their perceptions of actual and preferred classroom environment (Fraser, in press,a), relationships between student learning outcomes and congruence between actual and

preferred classroom environment (Rentoul and Fraser, 1980), and ways in which classroom practices might be changed in order to align the actual classroom environment with the preferred environment as perceived by students or teachers (Fraser, 1981b).

Development of ICEQ

A comprehensive description of the initial development of the ICEQ is contained in Rentoul and Fraser (1979) and Fraser (1981a). The ICEQ's development was guided by the following three criteria:

1. Dimensions chosen characterized the classroom learning environment described in the literature of individualized education, including open and inquiry-based classrooms (e.g., Rathbone, 1971; Weisgerber, 1971; Traub, Weiss, Fisher and Musella, 1972; Walberg and Thomas, 1972) and in individualized curriculum materials.

2. Dimensions chosen provided coverage of the three general categories of dimensions delineated by Moos (Insel and Moos, 1974; Moos, 1974) for conceptualizing human environments. These three general categories are Relationship Dimensions (nature and intensity of personal relationships), Personal Development Dimensions (basic directions along which personal growth and self-enhancement tend to occur), and System Maintenance and System Change Dimensions (extent to which the environment is orderly, clear in expectation, maintains control, and is responsive to change).

3. Dimensions chosen and individual questionnaire items were considered salient and suitable by a group of educational researchers, practising teachers, and secondary school students.

Important steps in developing the ICEQ involved modifying an original pool of items after receiving reactions solicited from groups of educational researchers, practising teachers, and junior high school students, and further refining the scales to form a final version by application of item analysis techniques to data collected from several different samples of teachers and students (see Rentoul and Fraser, 1979). The final version of the ICEQ contains 50 items, with each of the five dimensions being assessed by 10 items. Item wording is identical in all four forms of the ICEQ, but a different set of instructions is used for each form. Each item is scored on a five-point scale with responses of Almost Never, Seldom, Sometimes, Often, and Very Often. The scoring direction is reversed for approximately half of the items. Table 1 further clarifies the nature of the ICEQ by showing the classification of each scale according to Moos' scheme and by providing a scale description and sample item for each scale.

Validation of the ICEQ

The Student Actual and Student Preferred forms of the ICEQ have been administered to a sample of 150 junior high school classes in Australia. This sample consisted of 116 classes from 33 different schools in Tasmania and 34 classes from 34 different schools in New South Wales. Schools were located in both suburban and country areas and approximately equal numbers of boys and girls made up the sample. All 116 classes in Tasmania were science classes, whereas the 34 classes in New South Wales were made up of an approximately equal number of science and social science classes. A total of 1,849 students replied to the Student Actual form, while 1,858 students responded to

TABLE 1. Descriptive Information for Each Scale of ICEQ

Scale Name	Moos' General Category	Description of Scale	Sample Item
Personalization	Relationship	Emphasis on opportunities for individual students to interact with the teacher and on concern for the personal welfare and social growth of the individual	The teacher considers students' feelings. (+)
Participation	Relationship	Extent to which students are encouraged to participate rather than be passive listeners	The teacher lectures without students asking or answering questions. (-)
Independence	Personal Development	Extent to which students are allowed to make decisions and have control over their own learning and behavior	Students choose their partners for group work. (+)
Investigation	Personal Development	Emphasis on the skills and processes of inquiry and their use in problem-solving and investigation	Students find out the answers to questions and problems from the teacher rather than from investigations. (-)
Differentiation	System Maintenance	Emphasis on the selective treatment of students on the basis of ability, learning style, interests, and rate of working	Different students use different books, equipment, and materials. (+)

Items designated (+) are scored 1, 2, 3, 4, 5, respectively, for the responses Almost Never, Seldom, Sometimes, Often, Very Often. Items designated (-) are scored in the reverse manner.

the Student Preferred form. Also 90 of the 150 teachers of this sample of classes responded to the ICEQ's Teacher Actual form, and of these teachers 34 also provided responses to the Teacher Preferred form.

Data from these samples have been analyzed to provide information about the following five statistical characteristics relevant to the validity of ICEQ scales:

a) Internal consistency Estimates of the internal consistency of the four forms of each ICEQ scale were calculated using Cronbach's alpha coefficient. Because both the individual student and the class mean have been used commonly in past classroom environment research, indices of the internal consistency for both individual students and class means were generated for the student forms of ICEQ. These class estimates were made simply by using the variance of class item means in conjunction with the conventional alpha formula. In Table 2 estimates obtained for the alpha coefficient for each scale are shown separately for each form of the ICEQ and for the individual and the class mean as the unit of statistical analysis. These values suggest that each ICEQ scale has acceptable internal consistency for use in each of its four forms and with either the individual student or the class mean as the unit of analysis.

b) Discriminant validity Table 2 also reports data about discriminant validity (using the mean correlation of a scale with the other four scales as a convenient index of discriminant validity). These statistics have been calculated for students forms of the ICEQ separately using the individual and the class mean as the unit of analysis. These values are small enough to suggest that each ICEQ scale has adequate discriminant validity for use in each of its four forms and with either the individual student or the class mean as the unit of analysis. In turn, this suggests that the ICEQ measures distinct although somewhat overlapping aspects of classroom environment.

c) Test-retest reliability Some preliminary information about the test-retest reliability of the ICEQ was obtained for a sample of 105 junior high school students in suburban Sydney schools responding to the Student Actual form on two occasions three weeks apart. Test-retest reliability coefficients were found to be 0.78 for Personalization, 0.67 for Participation, 0.83 for Independence, 0.75 for Investigation, and 0.78 for Differentiation. These data suggest that the Student Actual form of the ICEQ displays satisfactory test-retest reliability.

d) Ability to differentiate between classrooms Another desirable characteristic of any classroom environment instrument is that it is capable of differentiating between the perceptions of students in different classrooms. That is, students within the same class should perceive it relatively similarly, while mean within-class perceptions should vary from classroom to classroom. This characteristic was explored for each scale of the Student Actual form of the ICEQ using the sample of 1,849 students in 150 classes. This involved performing a one-way ANOVA, with class membership as the main effect and using the individual as the unit of analysis. The results of these analyses are shown in Table 3 which indicates that each ICEQ scale differentiated significantly ($p<.001$) between classrooms. Also the eta^2 statistic, which is the ratio of between to total sums of squares, was calculated as an estimate of the amount of variance in ICEQ scores attributable to class membership. This table shows that the proportion of variance accounted for by class membership ranged from 20 per cent for the Investigation scale to 43 per cent for the Differentiation scale.

TABLE 2. Internal Consistency (Alpha Reliability) and Discriminant Validity (Mean Correlation of a Scale with Other Four Scales) for each Form of ICEQ for Two Units of Analysis

Scale Name	Unit of Analysis	Alpha Reliability				Mean Correlation with Other Scales			
		Student actual (N=1849 & 150)[a]	Student pref. (N=1858 & 150)[a]	Teacher actual (N=90)	Teacher pref. (N=34)	Student actual (N=150)	Student pref. (N=150)	Teacher actual (N=90)	Teacher pref. (N=34)
Personalization	Individual	0.79	0.74	0.79	0.74	0.28	0.31	0.32	0.29
	Class	0.90	0.86			0.31	0.35		
Participation	Individual	0.70	0.67	0.79	0.82	0.27	0.29	0.39	0.34
	Class	0.80	0.75			0.32	0.32		
Independence	Individual	0.68	0.70	0.83	0.86	0.07	0.12	0.23	0.25
	Class	0.78	0.79			0.16	0.17		
Investigation	Individual	0.71	0.75	0.80	0.90	0.21	0.27	0.34	0.33
	Class	0.77	0.83			0.29	0.31		
Differentiation	Individual	0.76	0.75	0.85	0.81	0.10	0.16	0.29	0.16
	Class	0.91	0.92			0.19	0.20		

[a] The sample sizes shown are the number of individual students and classes, respectively.

TABLE 3: ANOVA Results for Class Membership Differences in Student Perceptions of Actual Classroom Environment

ICEQ Scale	MS Between	MS Within	df	F	Eta^2
Personalization	169.4	33.3	150, 1699	5.1***	0.31
Participation	70.4	23.4	150, 1699	3.1***	0.21
Independence	107.8	22.2	150, 1699	4.9***	0.30
Investigation	73.6	26.0	150, 1699	2.8***	0.20
Differentiation	154.8	17.4	150, 1699	8.9***	0.43

*** $p<.001$

Eta^2 is the ratio of between to total sums of squares and indicates proportion of variance explained by class membership.

Sample size was 1,849 students in 150 classes.

e) Associations between teacher and student actual scores The existence of a sizable positive association between teachers' actual scores and the class means of students' actual scores would support the concurrent validity of the ICEQ's actual forms. Two different statistics were calculated to describe these associations using the sample of 90 teachers who replied to the Teacher Actual form together with the corresponding sample of 90 classes of students. Product-moment correlations between the 90 pairs of teachers' and students' scores were found to be 0.68 for Personalization, 0.53 for Participation, 0.24 for Independence, 0.50 for Investigation, and 0.39 for Differentiation. Also, in order to provide an index of the similarity of the teacher's profile to the students' mean profile for a particular classroom, a Spearman rank order correlation coefficient was calculated separately for each of the 90 classrooms for the set of five teacher/student pairs. The rank order coefficient was chosen because it is nonparametric and, consequently, is suitable for use in the present situation where the small sample size of five scales would invalidate the use of the product-moment coefficient. The mean rank order coefficient was found to be 0.80, with coefficients ranging from -0.13 to 1.00 for different classrooms. The results of these two types of analysis generally indicate the presence of quite sizable associations between teacher and student perceptions of actual classroom environment, and therefore support the validity of the actual forms of the ICEQ.

Differences Between Scores on Four Forms of ICEQ

The fact that the ICEQ has four different forms permits investigation of differences between student and teacher perceptions of the same classroom environment, and of discrepancies between the environment actually present in classrooms and that preferred by students or teachers. These questions were explored using data from a subsample consisting of 34 teachers and their 766 junior high school students in 34 classes in New South Wales (Fraser, in press,a). These data were used to generate four sets of environment

perception scores for each classroom, namely, the teacher's actual score, the teacher's preferred score, the class mean of students' actual scores, and the class mean of students' preferred scores on each of the five ICEQ scales. The means of these four sets of perception scores calculated across the 34 classrooms were then used as the basis for the construction of a simplified plot of significant differences between forms of the ICEQ.

The first stage in the construction of classroom environment profiles involved for each ICEQ scale the performance of a two-way analysis of variance with repeated measures on one factor. In these analyses, the four-level variable designating the form of the ICEQ (namely, Student Actual, Student Preferred, Teacher Actual, and Teacher Preferred) constituted the repeated measures factor. The other factor was a dichotomous variable designating whether the class being rated was either science or social science. The reason for including school subject as a factor was to explore whether different classroom environment profiles would be needed to describe science and social science classrooms. Results indicated that the Subject effect and the Form x Subject interaction were nonsignificant for all five ICEQ scales, thus suggesting that the same profiles could be used legitimately to describe either science or social science classes. Results for the Form effect indicated that significant differences ($p<.05$) existed between the instruments' four forms on all scales.

In order to interpret the significant findings for the four-level repeated measures Form factor, a series of t tests for dependent samples (using the conventional 0.05 level of confidence) was used to test pairwise comparisons between the different forms. This approach was adopted with the present limited sample size of 34 classes because it combined the good power characteristics of individual t tests with the protection against large experimentwise Type I error afforded by the requirement that the overall F also met the 0.05 significance criterion (Cohen and Cohen, 1975, p. 162; Carmer and Swanson, 1973). Furthermore, in an attempt to provide a more parsimonious picture of differences between scores on the four forms of the ICEQ, it was decided to include only statistically significant differences ($p<.05$) when plotting the profiles shown in Figure 1. Consequently, any nonsignificant difference revealed between a pair of forms in the t tests was represented as a zero difference by averaging the relevant pair of scores.

The interpretation of the profiles shown in Figure 1 is made easier by the fact that results are identical for the four scales of Personalization, Participation, Investigation, and Differentiation. For each of these four scales, the highest scores emerged for the Teacher Preferred form, the next highest scores for the Teacher Actual and the Student Preferred form (which were not significantly different from each other), and the lowest scores for the Student Actual form. For the Independence scale, Figure 1 shows that scores on the Student Preferred form were significantly higher than scores on the other three forms, which were not significantly different from each other.

These results depicted in Figure 1 provide three fascinating general conclusions about this particular group of classrooms. First, in comparison to the emphasis they perceived as being actually present, both teachers and students tended to prefer a greater emphasis on classroom Personalization, Participation, Investigation, and Differentiation. Second, teachers tended

to perceive greater actual individualization in their classrooms (in terms of Personalization, Participation, Investigation, and Differentiation) than was perceived by students in the same classrooms. Moreover, these first two patterns of findings are quite consistent with results reported by Moos (1979) for the Classroom Environment Scale. Third, and in contrast to the above findings, students tended to prefer greater Independence than was actually present, whereas teachers considered the actual emphasis on Independence appropriate.

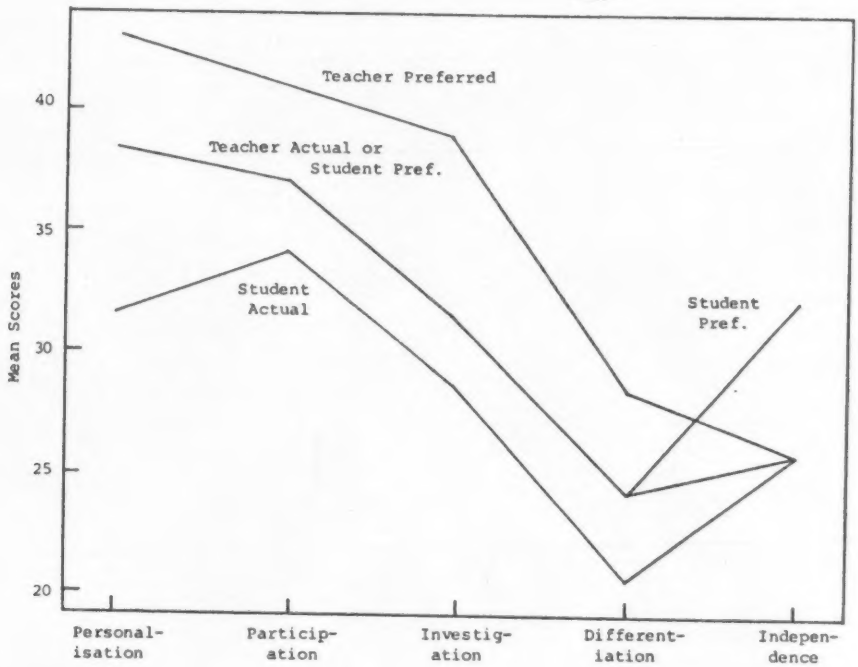

FIGURE 1. Mean Score Profiles for Four Forms of ICEQ

Predictive Validity of Student Perceptions of Actual Environment

The strongest tradition in past classroom environment research has involved investigation of the predictability of students' cognitive and affective learning outcomes from their perceptions of psychosocial characteristics of their classrooms. Moreover, numerous research programs involving many thousands of students from various nations have provided convincing and consistent support for the incremental predictive validity of student perceptions in accounting for appreciable amounts of variance in learning outcomes beyond that attributable to initial student characteristics such as pretest performance and general ability. This approach involving increments in criterion variance provides a conservative test of whether classroom environment perceptions are related to learning outcomes when the variance attributable to well-known and better established predictors has

been removed. That is, for reasons of simplicity, learning environment dimensions can be considered useful predictors of learning outcomes only if they account for different variance from that attributable to well established predictors.

Two separate prior studies have investigated the incremental predictive validity of perceptions on the Student Actual form of the ICEQ. Both studies involved junior high school students and, because sample sizes were limited, employed the individual student as the unit of statistical analysis. The first study of 285 students in 15 classes (Rentoul and Fraser, 1980) revealed that the five ICEQ scales together accounted for a significant increment in variance in an affective outcome but not in two cognitive outcomes (beyond that attributable to corresponding pretest, general ability, and sex). The second study of 320 students in 14 classes revealed that student perceptions on the ICEQ accounted for a significant increment in the variance of several attitudinal outcomes beyond that attributable to corresponding beginning-of-year attitudes (Fraser, in press,b).

The sample of 116 Tasmanian science classes described previously was sufficiently large to permit the use of the class mean as the unit of statistical analysis in an attempt to replicate prior findings about the incremental predictive validity of the Student Actual form of the ICEQ. Students in this sample responded to the actual form of the ICEQ at mid-year and to a cognitive and an affective outcome measure towards the end of the year. The cognitive measure was a 29-item multiple-choice critical thinking in science test (Fraser, 1979) and the affective measure was a 60-item Likert-type scale measuring attitude to science (Fraser, 1981c). The alpha reliability for class means was greater than 0.9 for both outcome measures for this sample. Also beginning-of-year scores on each outcome measure and general ability data were available for students in each class.

Table 4 shows the results obtained when a hierarchical regression analysis was conducted separately for each outcome. The first row of figures indicates that corresponding pretest and general ability together accounted for 44.3 per cent of the variance in the affective outcome and 69.0 per cent of the variance in the cognitive outcome. The second row indicates that the increment in posttest variance accounted for by the block of five ICEQ scales, beyond that attributable to corresponding pretest and general ability, was 7.1 per cent for the affective outcome and 1.1 per cent for the cognitive outcome. This increment was significant ($p<.01$) for the affective outcome but not for the cognitive outcome. The interpretation of the significant finding for the attitudinal outcome was that attitude scores were higher in classrooms perceived as having greater Participation ($\beta=0.22$, $t=2.3$, $p<.05$). Furthermore, the present finding that actual classroom individualization tended to be linked with affective but not cognitive outcomes is consistent with prior results obtained using the ICEQ (Rentoul and Fraser, 1980) and with Horwitz's (1979) recent comprehensive review of open education studies.

Person-Environment Fit

Whereas prior research has concentrated on the predictive validity of student perceptions of actual classroom environment, having actual and preferred forms of the ICEQ enables a confluence of two previously distinct research traditions - classroom environment research and person-environment fit research (Mitchell, 1969; Hunt, 1975). The ICEQ was used in a prior study (Fraser and Rentoul, 1980, Rentoul and Fraser, 1980) to provide a set of five dimensions characterizing student perceptions of actual

classroom individualization and another five commensurate personal dimensions consisting of student perceptions of their preferred environment. Relationships between learning outcomes and actual-preferred congruence (person-environment fit) were than tested for the previous sample of 285 students to explore the intuitively plausible notion that students who differ in their preferences for classroom individualization could achieve differentially depending upon the amount of actual individualization present in their classrooms. Person-environment fit on each dimension was defined in terms of interactions of actual and preferred variables, and was obtained by taking the product of continuous scores obtained on corresponding actual and preferred scales.

Hierarchical regression analyses using the student as the unit of analysis revealed that the block of actual-preferred interactions accounted for a significant increment in cognitive achievement beyond that attributable to corresponding pretest, general ability, and sex. The person-environment fit hypothesis was supported by several significant findings for individual ICEQ scales indicating that the relationship between learning outcomes and actual individualization tended to be positive for students higher in preferred individualization but negative for students lower in preferred individualization.

TABLE 4. Percentage of Variance in Learning Outcomes Accounted for by Corresponding Pretest and General Ability, Actual Individualization, and Actual-Preferred Interactions

Predictor Variables	Increment in Percentage of Posttest Variance Accounted For	
	Affective outcome	Cognitive outcome
Corresponding pretest and general ability	44.3**	69.0**
Block of 5 actual individualization (ICEQ) scales	7.1**	1.1
Block of 5 actual-preferred interactions	7.0**	3.2*
R^2(%) for full 12-term model:	58.4	73.3

* $p < .05$
** $p < .01$

The same sample of 116 classes involved in the predictive validity analyses described in the previous section was used recently in another study of person-environment fit. These analyses included the same two learning outcome posttests (one affective and one cognitive), the two corresponding pretests, the two background characteristics (corresponding pretest and general ability), and the five actual individualization variables as measured by the Student Actual form of the ICEQ. The distinguishing feature of the new set of analyses is that it incorporated students' perceptions of five dimensions of preferred environment as measured by the preferred form of the ICEQ. As preferred classroom environment per se was not of interest, however, data from the actual and preferred forms of the ICEQ were used to generate five new variables indicating the congruence between actual and preferred individualization.

A hierarchical regression analysis was performed separately for each learning outcome posttest. The first stage of each analysis simply involved entering the set of seven predictors used in the previous analyses (see Table 4). These variables were the corresponding pretest, general ability, and the five actual individualization variables. The second stage in each analysis involved adding to the regression equation a block of five variables representing actual-preferred congruence (or person-environment fit) on each ICEQ dimension. Person-environment fit for each dimension was defined in terms of interactions of actual and preferred variables and was obtained by taking the product of continuous scores obtained on corresponding dimensions of the actual and preferred forms of the ICEQ. Furthermore, the block of actual-preferred interactions was entered into the regression equations last because, on grounds of simplicity, it would be unwise to attempt to explain criterion variance in terms of actual-preferred interactions unless they account for extra variance over and above that explainable in terms of actual learning environment (and pretest and general ability).

Table 4 shows the results obtained from the hierarchical regression analyses when the block of five actual-preferred interactions was added to the equation already containing seven variables. These results indicate that the increment in posttest variance associated with the block of actual-preferred interactions (beyond that attributable to the corresponding pretest, general ability, and the five actual individualization variables) was 7.0 per cent for the affective outcomes and 3.2 per cent for the cognitive outcome. These increments in posttest variance due to actual-preferred interactions were significant ($p<.05$) for both outcomes.

In order to interpret these significant findings for the block of actual-preferred interactions, an examination was made of the regression weights for the full 12-term model. This showed that the actual-preferred interactions for Personalization ($\beta = 0.58$, $t=3.1$, $p<.01$) and for Differentiation ($\beta=0.69$, $t=2.2$, $p<.05$) were significantly associated with affective outcome scores, and that the actual-preferred interaction for Differentiation ($\beta=0.75$, $t=2.9$, $p<.01$) was significantly associated with cognitive achievement scores.

In an attempt to interpret these three significant actual-preferred interactions for individual ICEQ scales, three-dimensional plots were sketched. In these plots, the vertical axis represented residual posttest scores which had been adjusted for all variables preceding interactions in the hierarchical regression analysis (i.e., pretest, general ability, and actual individualization variables). One horizontal axis represented continuous scores on

one of the actual individualization variables, while the other horizontal axis represented continuous scores on the corresponding preferred individualization scale. Inspection of these plots indicated that, in all three cases, the hypothesized person-environment interaction emerged in that the relationship between residual posttest scores and actual individualization scores was positive for students higher in preferred individualization but negative for students lower in preferred individualization. For example, the interpretation of the actual-preferred interaction for the Differentiation scale and the cognitive outcome was that residual posttest scores increased with increasing amounts of actual classroom Differentiation for students with higher preferred Differentiation scores, but residual cognitive scores decreased with increased actual Differentiation for students with lower preferred Differentiation scores.

The present finding that actual-preferred interactions accounted for appreciable amounts of affective and cognitive outcome variance suggests that, in individualized classroom settings, a congruence between actual and preferred environment (i.e., person-environment fit) could be at least as important as individualization per se. These preliminary findings support the potential of incorporating a person-environment interactional perspective into future classroom environment research by considering student preferences simultaneously with actual classroom environment.

Conclusion

This paper has outlined the initial development of the Individualized Classroom Environment Questionnaire (ICEQ) and reported data relevant to its validity. In particular, data were presented to support the internal consistency and discriminant validity of the Student Actual and Preferred forms (using either the individual or the class mean as the unit of analysis) and of the Teacher Actual and Preferred forms. Other data attested to the Student Actual form's test-retest reliability and ability to differentiate between classrooms, and revealed sizable positive associations between teacher and student perceptions of the actual environment of the same classrooms. An investigation of differences on the four forms of the ICEQ revealed that, first, in comparison to the emphasis they perceived as being actually present, both teachers and students tended to prefer greater classroom individualization and, second, teachers tended to perceive greater actual individualization in their classrooms than did students in the same classrooms. Also, an investigation of the predictive validity of the Student Actual form of the ICEQ using the class mean as the unit of analysis replicated prior research in that student perceptions of classroom individualization accounted for a significant increment in the variance of an affective but not a cognitive outcome (beyond that attributable to corresponding pretest and general ability). Finally, data were presented with suggest that learning outcomes were associated with the congruence between actual and preferred environment (i.e., person-environment fit).

Research reported elsewhere (Fraser, 1980b) describes analyses in which scores on various forms of the ICEQ were used as dependent variables and which furnished evidence about the ICEQ's criterion validity. First, scores on several scales in the actual forms of the ICEQ were found to be significantly higher in classrooms using individualized curriculum materials than

in classrooms following conventional materials; this supports the usefulness of the ICEQ's Student Actual form in monitoring innovations in individualization. Second, beginning teachers' preferences for two dimensions of classroom individualization became significantly more positive during the first year of teaching; this attests to the potential usefulness of the ICEQ's Teacher Preferred form in research into teachers' pedagogical attitudes. Third, greater affiliation and innovativeness in the school environment was found to be associated with greater classroom Personalization, greater school professional interest was associated with greater classroom Independence, and greater school achievement orientation was associated with more classroom Investigation.

It is highly desirable that the recent emphasis on classroom environment research should have some practical application in facilitating environmental change. Having actual and preferred forms of classroom environment instruments opens up the possibility of using profiles of environment scores as a basis for replection upon and subsequent improvement of classroom environments. In particular, by assessing students' perceptions of their actual and preferred classroom environment, data about actual-preferred discrepancies can be used as a basis for planning environmental changes which align the actual environment with students' preferred environment. Although profiles of milieu inhabitants' perceptions of actual and preferred environment scores have been employed successfully in facilitating environmental change in psychiatric wards (Pierce, Trickett and Moos, 1972), college environments (DeYoung, 1977), staff work environments (Schroeder, 1979), and alcoholism treatment programs (Bliss, Moos and Bromet, 1979), not a single report of the application of these methods in school classrooms has yet appeared. Nevertheless, Fraser (1981b) has provided a comprehensive review of literature pertinent to the facilitation of environmental improvement, and illustrated various ways that data based on the ICEQ can be processed to form profiles useful in guiding systematic attempts to improve classroom environments.

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Note A copy of the ICEQ together with scoring directions may be requested from the author at School of Education, Macquarie University, North Ryde, N.S.W. 2113, Australia.

APPENDIX A: ICEQ ITEMS AND DIRECTIONS FOR ANSWERING AND SCORING

This appendix contains a copy of the following:

1. Student Actual form of ICEQ (first two pages)
2. Instructions for answering Student Preferred, Teacher Actual and Teacher Preferred forms of ICEQ (third page)
3. Response Sheet for Student Actual form of ICEQ (fourth page)
4. Scale allocation and scoring directions for each item in ICEQ (fifth page)

INDIVIDUALISED CLASSROOM ENVIRONMENT QUESTIONNAIRE (ICEQ)

STUDENT ACTUAL FORM

DIRECTIONS

1. This questionnaire contains statements about practices which could take place in your ..... classroom. You will be asked how often each practice actually takes place in your ..... classroom.

2. There are no 'right' or 'wrong' answers. Your opinion is what is wanted.

3. Please do not write on this test. All answers should be written on your Response Sheet.

4. Think about how well each statement describes your ..... classroom. On your Response Sheet draw a circle around

1	if the practice takes place	ALMOST NEVER
2	if the practice takes place	SELDOM
3	if the practice takes place	SOMETIMES
4	if the practice takes place	OFTEN
5	if the practice takes place	VERY OFTEN

5. Be sure to give an answer for all questions. If you change your mind about an answer, just cross it out and circle another.

1. The teacher talks with each student.
2. All students in the class use the same textbooks.
3. Students find out the answers to questions from textbooks rather than from investigations.
4. The teacher talks rather than listens.
5. The teacher decides where students sit.
6. Students discuss their work in class.
7. Students work at their own speed.
8. Students draw conclusions from information.
9. The teacher takes a personal interest in each student.
10. The teacher goes out of his way to help each student.

11. Students choose their partners for group work.
12. All students in the class do the same work at the same time.
13. Students carry out investigations to test ideas.
14. Most students take part in discussions.
15. The teacher is unfriendly to students.
16. Different students do different work.
17. Students find out the answers to questions and problems from the teacher rather than from investigations.
18. Students give their opinions during discussions.
19. Different students use different tests.
20. Students are asked to think about the evidence behind statements.

Further information about this questionnaire can be obtained from A. Rentoul and B. Fraser, Macquarie University.

(Remember you are rating actual classroom practices)

21. The teacher lectures without students asking or answering questions.

22. Students are told exactly how to do their work.

23. The teacher helps each student who is having trouble with his work.

24. Students who have finished their work wait for the others to catch up.

25. Students are told how to behave in the classroom.

26. The teacher remains at the front of the class rather than moving about and talking with students.

27. Students carry out investigations to answer questions coming from class discussions.

28. The teacher decides when students are to be tested.

29. Students are punished if they behave badly in class.

30. Different students use different books, equipment and materials.

31. Students explain the meaning of statements, diagrams and graphs.

32. Students are asked questions.

33. The teacher decides which students should work together.

34. Students are told what will happen if they break any rules.

35. The teacher considers students' feelings.

36. Students who work faster than others move on to the next topic.

37. Students carry out investigations to answer questions which puzzle them.

38. Students sit and listen to the teacher.

39. Students are encouraged to be considerate of other people's ideas and feelings.

40. The same teaching aid (e.g., blackboard or overhead projector) is used for all students in the class.

41. Investigations are used to answer the teacher's questions.

42. Students' ideas and suggestions are used during classroom discussion.

43. Students who break the rules get into trouble.

44. The teacher tries to find out what each student wants to learn about.

45. Students ask the teacher questions.

46. The teacher uses tests to find out where each student needs help.

47. All students are expected to do the same amount of work in a lesson.

48. Students solve problems by obtaining information from the library.

49. There is classroom discussion.

50. The teacher decides how much movement and talk there should be in the classroom.

Directions for Student Preferred Form

1. This questionnaire contains statements about practices which could take place in your ..... classroom. You will be asked how often you would like or prefer each practice to take place in your ..... classroom.

2. There are no 'right' or 'wrong' answers. Your opinion is what is wanted.

3. Please do not write on this questionnaire. All answers should be written on your Response Sheet.

4. Think about how well each statement describes your ..... classroom. On your Response Sheet draw a circle around

1	if you would prefer the practice to take place	ALMOST NEVER
2	if you would prefer the practice to take place	SELDOM
3	if you would prefer the practice to take place	SOMETIMES
4	if you would prefer the practice to take place	OFTEN
5	if you would prefer the practice to take place	VERY OFTEN

5. Be sure to give an answer for all questions. If you change your mind about an answer, just cross it out and circle another.

Directions for Teacher Actual Form

This questionnaire is designed to obtain information about classroom practices which actually take place in your classroom.

Consider how often the teaching practice described in each of the following statements actually takes place in your classroom.

Indicate your response by circling the number on your Response Sheet corresponding to your chosen response.

Directions for Teacher Preferred Form

This questionnaire is designed to obtain information about your preferences for different classroom practices.

Consider how often you would like or prefer the teaching practice described in each of the following statements to take place in your classroom.

Indicate your response by circling the number on your Response Sheet corresponding to your chosen response.

INDIVIDUALISED CLASSROOM ENVIRONMENT QUESTIONNAIRE (ICEQ)

RESPONSE SHEET

NAME: _____ CLASS: _____ BOY/GIRL: _____
(BLOCK LETTERS)

PART A - ACTUAL CLASSROOM PRACTICES

PAGE 1

	Almost never	Seldom	Some-times	Often	Very often		Almost never	Seldom	Some-times	Often	Very often
1.	1	2	3	4	5	11.	1	2	3	4	5
2.	1	2	3	4	5	12.	1	2	3	4	5
3.	1	2	3	4	5	13.	1	2	3	4	5
4.	1	2	3	4	5	14.	1	2	3	4	5
5.	1	2	3	4	5	15.	1	2	3	4	5
6.	1	2	3	4	5	16.	1	2	3	4	5
7.	1	2	3	4	5	17.	1	2	3	4	5
8.	1	2	3	4	5	18.	1	2	3	4	5
9.	1	2	3	4	5	19.	1	2	3	4	5
10.	1	2	3	4	5	20.	1	2	3	4	5

(Remember you are rating actual classroom practices)

PAGE 2

	Almost never	Seldom	Some-times	Often	Very often		Almost never	Seldom	Some-times	Often	Very often
21.	1	2	3	4	5	36.	1	2	3	4	5
22.	1	2	3	4	5	37.	1	2	3	4	5
23.	1	2	3	4	5	38.	1	2	3	4	5
24.	1	2	3	4	5	39.	1	2	3	4	5
25.	1	2	3	4	5	40.	1	2	3	4	5
26.	1	2	3	4	5	41.	1	2	3	4	5
27.	1	2	3	4	5	42.	1	2	3	4	5
28.	1	2	3	4	5	43.	1	2	3	4	5
29.	1	2	3	4	5	44.	1	2	3	4	5
30.	1	2	3	4	5	45.	1	2	3	4	5
31.	1	2	3	4	5	46.	1	2	3	4	5
32.	1	2	3	4	5	47.	1	2	3	4	5
33.	1	2	3	4	5	48.	1	2	3	4	5
34.	1	2	3	4	5	49.	1	2	3	4	5
35.	1	2	3	4	5	50.	1	2	3	4	5

(Remember you are rating actual classroom practices)

INDIVIDUALISED CLASSROOM ENVIRONMENT QUESTIONNAIRE (ICEQ)

Scale Allocation and Scoring Procedure

Personalisation		Participation		Independence		Investigation		Differentiation	
1	+	4	-	5	-	3	-	2	-
9	+	6	+	11	+	8	+	7	+
10	+	14	+	22	-	13	+	12	-
15	-	18	+	25	-	17	-	16	+
23	+	21	-	28	-	20	+	19	+
26	-	32	+	29	-	27	+	24	-
35	+	38	-	33	-	31	+	30	+
39	+	42	+	34	-	37	+	36	+
44	+	45	+	43	-	41	+	40	-
46	+	49	+	50	-	48	+	47	-

Items designated + are scored by allocating 1, 2, 3, 4, 5, respectively, to the responses Almost Never, Seldom, Sometimes, Often, and Very Often. Items designated - are scored in the reverse manner. Ommitted or invalid responses are given a score of 3.